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> #Source term Q for the 2D Navier-Stokes equations -
> # Energy e

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$$
\begin{aligned}
Q := {} & \frac{1}{2}\left(rho\_x\cos\left(\frac{a\_rhox\,\pi\,x}{L}\right)a\_rhox\,\pi\left(u\_0+u\_x\sin\left(\frac{a\_ux\,\pi\,x}{L}\right)\right.\right. \\
& \left.\left.+u\_y\cos\left(\frac{a\_uy\,\pi\,y}{L}\right)\right)\left(2\,p\_x\cos\left(\frac{a\_px\,\pi\,x}{L}\right)+2\,p\_y\sin\left(\frac{a\_py\,\pi\,y}{L}\right)+2\,p\_0\right. \\
& +2\,u\_x\sin\left(\frac{a\_ux\,\pi\,x}{L}\right)u\_y\cos\left(\frac{a\_uy\,\pi\,y}{L}\right)\gamma\,rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right) \\
& +2\,u\_x\sin\left(\frac{a\_ux\,\pi\,x}{L}\right)u\_y\cos\left(\frac{a\_uy\,\pi\,y}{L}\right)\gamma\,rho\_y\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right) \\
& +2\,\gamma\,v\_x\cos\left(\frac{a\_vx\,\pi\,x}{L}\right)v\_y\sin\left(\frac{a\_vy\,\pi\,y}{L}\right)rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right) \\
& +2\,\gamma\,v\_x\cos\left(\frac{a\_vx\,\pi\,x}{L}\right)v\_y\sin\left(\frac{a\_vy\,\pi\,y}{L}\right)rho\_y\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right) \\
& -u\_0^2\,rho\_0-v\_0^2\,rho\_0+u\_0^2\,\gamma\,rho\_0-u\_x^2\sin\left(\frac{a\_ux\,\pi\,x}{L}\right)^2rho\_0 \\
& -u\_y^2\cos\left(\frac{a\_uy\,\pi\,y}{L}\right)^2rho\_0-u\_0^2\,rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right) \\
& -u\_0^2\,rho\_y\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)-v\_x^2\cos\left(\frac{a\_vx\,\pi\,x}{L}\right)^2rho\_0 \\
& -v\_y^2\sin\left(\frac{a\_vy\,\pi\,y}{L}\right)^2rho\_0+\gamma\,v\_0^2\,rho\_0-v\_0^2\,rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right) \\
& -v\_0^2\,rho\_y\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right) \\
& -2\,u\_0\,u\_x\sin\left(\frac{a\_ux\,\pi\,x}{L}\right)rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right) \\
& -2\,u\_0\,u\_x\sin\left(\frac{a\_ux\,\pi\,x}{L}\right)rho\_y\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right) \\
& -2\,u\_0\,u\_y\cos\left(\frac{a\_uy\,\pi\,y}{L}\right)rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right) \\
& -2\,u\_0\,u\_y\cos\left(\frac{a\_uy\,\pi\,y}{L}\right)rho\_y\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right) \\
& +u\_x^2\sin\left(\frac{a\_ux\,\pi\,x}{L}\right)^2\gamma\,rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right) \\
& +u\_x^2\sin\left(\frac{a\_ux\,\pi\,x}{L}\right)^2\gamma\,rho\_y\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)
\end{aligned}
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\begin{aligned}
&+2\,u\_0\,u\_x\sin\left(\frac{a\_ux\pi\,x}{L}\right)\gamma\,rho\_0+2\,u\_0\,u\_y\cos\left(\frac{a\_uy\pi\,y}{L}\right)\gamma\,rho\_0\\
&-2\,u\_x\sin\left(\frac{a\_ux\pi\,x}{L}\right)u\_y\cos\left(\frac{a\_uy\pi\,y}{L}\right)rho\_0\\
&+u\_y^2\cos\left(\frac{a\_uy\pi\,y}{L}\right)^2\gamma\,rho\_x\sin\left(\frac{a\_rhox\pi\,x}{L}\right)\\
&+u\_y^2\cos\left(\frac{a\_uy\pi\,y}{L}\right)^2\gamma\,rho\_y\cos\left(\frac{a\_rhoy\pi\,y}{L}\right)\\
&-2\,v\_0\,v\_x\cos\left(\frac{a\_vx\pi\,x}{L}\right)rho\_x\sin\left(\frac{a\_rhox\pi\,x}{L}\right)\\
&-2\,v\_0\,v\_x\cos\left(\frac{a\_vx\pi\,x}{L}\right)rho\_y\cos\left(\frac{a\_rhoy\pi\,y}{L}\right)\\
&-2\,v\_0\,v\_y\sin\left(\frac{a\_vy\pi\,y}{L}\right)rho\_x\sin\left(\frac{a\_rhox\pi\,x}{L}\right)\\
&-2\,v\_0\,v\_y\sin\left(\frac{a\_vy\pi\,y}{L}\right)rho\_y\cos\left(\frac{a\_rhoy\pi\,y}{L}\right)\\
&+\gamma\,v\_x^2\cos\left(\frac{a\_vx\pi\,x}{L}\right)^2rho\_x\sin\left(\frac{a\_rhox\pi\,x}{L}\right)\\
&+\gamma\,v\_x^2\cos\left(\frac{a\_vx\pi\,x}{L}\right)^2rho\_y\cos\left(\frac{a\_rhoy\pi\,y}{L}\right)\\
&+\gamma\,v\_y^2\sin\left(\frac{a\_vy\pi\,y}{L}\right)^2rho\_x\sin\left(\frac{a\_rhox\pi\,x}{L}\right)\\
&+\gamma\,v\_y^2\sin\left(\frac{a\_vy\pi\,y}{L}\right)^2rho\_y\cos\left(\frac{a\_rhoy\pi\,y}{L}\right)\\
&-2\,v\_x\cos\left(\frac{a\_vx\pi\,x}{L}\right)v\_y\sin\left(\frac{a\_vy\pi\,y}{L}\right)rho\_0\\
&+2\,\gamma\,v\_0\,v\_x\cos\left(\frac{a\_vx\pi\,x}{L}\right)rho\_0+2\,\gamma\,v\_0\,v\_y\sin\left(\frac{a\_vy\pi\,y}{L}\right)rho\_0\\
&+2\,u\_x\sin\left(\frac{a\_ux\pi\,x}{L}\right)u\_y\cos\left(\frac{a\_uy\pi\,y}{L}\right)\gamma\,rho\_0\\
&+2\,u\_0\,u\_x\sin\left(\frac{a\_ux\pi\,x}{L}\right)\gamma\,rho\_x\sin\left(\frac{a\_rhox\pi\,x}{L}\right)\\
&+2\,u\_0\,u\_x\sin\left(\frac{a\_ux\pi\,x}{L}\right)\gamma\,rho\_y\cos\left(\frac{a\_rhoy\pi\,y}{L}\right)\\
&+2\,u\_0\,u\_y\cos\left(\frac{a\_uy\pi\,y}{L}\right)\gamma\,rho\_x\sin\left(\frac{a\_rhox\pi\,x}{L}\right)\\
&+2\,u\_0\,u\_y\cos\left(\frac{a\_uy\pi\,y}{L}\right)\gamma\,rho\_y\cos\left(\frac{a\_rhoy\pi\,y}{L}\right)\\
&-2\,u\_x\sin\left(\frac{a\_ux\pi\,x}{L}\right)u\_y\cos\left(\frac{a\_uy\pi\,y}{L}\right)rho\_x\sin\left(\frac{a\_rhox\pi\,x}{L}\right)
\end{aligned}
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\begin{aligned}
&-2\,u\_x\sin\left(\frac{a\_ux\pi\,x}{L}\right)u\_y\cos\left(\frac{a\_uy\pi\,y}{L}\right)rho\_y\cos\left(\frac{a\_rhoy\pi\,y}{L}\right)\\
&-2\,v\_x\cos\left(\frac{a\_vx\pi\,x}{L}\right)v\_y\sin\left(\frac{a\_vy\pi\,y}{L}\right)rho\_x\sin\left(\frac{a\_rhox\pi\,x}{L}\right)\\
&-2\,v\_x\cos\left(\frac{a\_vx\pi\,x}{L}\right)v\_y\sin\left(\frac{a\_vy\pi\,y}{L}\right)rho\_y\cos\left(\frac{a\_rhoy\pi\,y}{L}\right)\\
&+2\,\gamma\,v\_0\,v\_x\cos\left(\frac{a\_vx\pi\,x}{L}\right)rho\_x\sin\left(\frac{a\_rhox\pi\,x}{L}\right)\\
&+2\,\gamma\,v\_0\,v\_x\cos\left(\frac{a\_vx\pi\,x}{L}\right)rho\_y\cos\left(\frac{a\_rhoy\pi\,y}{L}\right)\\
&+2\,\gamma\,v\_0\,v\_y\sin\left(\frac{a\_vy\pi\,y}{L}\right)rho\_x\sin\left(\frac{a\_rhox\pi\,x}{L}\right)\\
&+2\,\gamma\,v\_0\,v\_y\sin\left(\frac{a\_vy\pi\,y}{L}\right)rho\_y\cos\left(\frac{a\_rhoy\pi\,y}{L}\right)\\
&+2\,\gamma\,v\_x\cos\left(\frac{a\_vx\pi\,x}{L}\right)v\_y\sin\left(\frac{a\_vy\pi\,y}{L}\right)rho\_0\\
&-2\,u\_0\,u\_x\sin\left(\frac{a\_ux\pi\,x}{L}\right)rho\_0-2\,u\_0\,u\_y\cos\left(\frac{a\_uy\pi\,y}{L}\right)rho\_0\\
&+u\_x^2\sin\left(\frac{a\_ux\pi\,x}{L}\right)^2\gamma\,rho\_0+u\_y^2\cos\left(\frac{a\_uy\pi\,y}{L}\right)^2\gamma\,rho\_0\\
&+u\_0^2\,\gamma\,rho\_x\sin\left(\frac{a\_rhox\pi\,x}{L}\right)+u\_0^2\,\gamma\,rho\_y\cos\left(\frac{a\_rhoy\pi\,y}{L}\right)\\
&-u\_x^2\sin\left(\frac{a\_ux\pi\,x}{L}\right)^2rho\_x\sin\left(\frac{a\_rhox\pi\,x}{L}\right)\\
&-u\_x^2\sin\left(\frac{a\_ux\pi\,x}{L}\right)^2rho\_y\cos\left(\frac{a\_rhoy\pi\,y}{L}\right)\\
&-u\_y^2\cos\left(\frac{a\_uy\pi\,y}{L}\right)^2rho\_x\sin\left(\frac{a\_rhox\pi\,x}{L}\right)\\
&-u\_y^2\cos\left(\frac{a\_uy\pi\,y}{L}\right)^2rho\_y\cos\left(\frac{a\_rhoy\pi\,y}{L}\right)\\
&-v\_x^2\cos\left(\frac{a\_vx\pi\,x}{L}\right)^2rho\_x\sin\left(\frac{a\_rhox\pi\,x}{L}\right)\\
&-v\_x^2\cos\left(\frac{a\_vx\pi\,x}{L}\right)^2rho\_y\cos\left(\frac{a\_rhoy\pi\,y}{L}\right)\\
&-v\_y^2\sin\left(\frac{a\_vy\pi\,y}{L}\right)^2rho\_x\sin\left(\frac{a\_rhox\pi\,x}{L}\right)\\
&-v\_y^2\sin\left(\frac{a\_vy\pi\,y}{L}\right)^2rho\_y\cos\left(\frac{a\_rhoy\pi\,y}{L}\right)\\
&+\gamma\,v\_0^2\,rho\_x\sin\left(\frac{a\_rhox\pi\,x}{L}\right)+\gamma\,v\_0^2\,rho\_y\cos\left(\frac{a\_rhoy\pi\,y}{L}\right)
\end{aligned}
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\begin{aligned}
&-2\,v\_0\,v\_x\cos\left(\frac{a\_vx\,\pi\,x}{L}\right)\,rho\_0-2\,v\_0\,v\_y\sin\left(\frac{a\_vy\,\pi\,y}{L}\right)\,rho\_0\\
&+\gamma\,v\_x^2\cos\left(\frac{a\_vx\,\pi\,x}{L}\right)^2\,rho\_0+\gamma\,v\_y^2\sin\left(\frac{a\_vy\,\pi\,y}{L}\right)^2\,rho\_0\Bigg)\Bigg)\Bigg/\Bigg(L\,(\gamma\\
&-1)\,\left(rho\_0+rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)+rho\_y\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)\right)\Bigg)\\
&+\frac{1}{2}\,\frac{1}{L\,(\gamma-1)}\left(u\_x\cos\left(\frac{a\_ux\,\pi\,x}{L}\right)\,a\_ux\,\pi\,\left(2\,p\_x\cos\left(\frac{a\_px\,\pi\,x}{L}\right)\right.\right.\\
&+2\,p\_y\sin\left(\frac{a\_py\,\pi\,y}{L}\right)+2\,p\_0\\
&+2\,u\_x\sin\left(\frac{a\_ux\,\pi\,x}{L}\right)\,u\_y\cos\left(\frac{a\_uy\,\pi\,y}{L}\right)\,\gamma\,rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)\\
&+2\,u\_x\sin\left(\frac{a\_ux\,\pi\,x}{L}\right)\,u\_y\cos\left(\frac{a\_uy\,\pi\,y}{L}\right)\,\gamma\,rho\_y\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)\\
&+2\,\gamma\,v\_x\cos\left(\frac{a\_vx\,\pi\,x}{L}\right)\,v\_y\sin\left(\frac{a\_vy\,\pi\,y}{L}\right)\,rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)\\
&+2\,\gamma\,v\_x\cos\left(\frac{a\_vx\,\pi\,x}{L}\right)\,v\_y\sin\left(\frac{a\_vy\,\pi\,y}{L}\right)\,rho\_y\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)\\
&-u\_0^2\,rho\_0-v\_0^2\,rho\_0+u\_0^2\,\gamma\,rho\_0-u\_x^2\sin\left(\frac{a\_ux\,\pi\,x}{L}\right)^2\,rho\_0\\
&-u\_y^2\cos\left(\frac{a\_uy\,\pi\,y}{L}\right)^2\,rho\_0-u\_0^2\,rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)\\
&-u\_0^2\,rho\_y\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)-v\_x^2\cos\left(\frac{a\_vx\,\pi\,x}{L}\right)^2\,rho\_0\\
&-v\_y^2\sin\left(\frac{a\_vy\,\pi\,y}{L}\right)^2\,rho\_0+\gamma\,v\_0^2\,rho\_0-v\_0^2\,rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)\\
&-v\_0^2\,rho\_y\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)\\
&-2\,u\_0\,u\_x\sin\left(\frac{a\_ux\,\pi\,x}{L}\right)\,rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)\\
&-2\,u\_0\,u\_x\sin\left(\frac{a\_ux\,\pi\,x}{L}\right)\,rho\_y\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)\\
&-2\,u\_0\,u\_y\cos\left(\frac{a\_uy\,\pi\,y}{L}\right)\,rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)\\
&-2\,u\_0\,u\_y\cos\left(\frac{a\_uy\,\pi\,y}{L}\right)\,rho\_y\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)\\
&+u\_x^2\sin\left(\frac{a\_ux\,\pi\,x}{L}\right)^2\,\gamma\,rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)\\
&+u\_x^2\sin\left(\frac{a\_ux\,\pi\,x}{L}\right)^2\,\gamma\,rho\_y\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)
\end{aligned}
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\begin{aligned}
&+2\,u\_0\,u\_x\sin\left(\frac{a\_ux\pi\,x}{L}\right)\gamma\,rho\_0+2\,u\_0\,u\_y\cos\left(\frac{a\_uy\pi\,y}{L}\right)\gamma\,rho\_0\\
&-2\,u\_x\sin\left(\frac{a\_ux\pi\,x}{L}\right)u\_y\cos\left(\frac{a\_uy\pi\,y}{L}\right)rho\_0\\
&+u\_y^2\cos\left(\frac{a\_uy\pi\,y}{L}\right)^2\gamma\,rho\_x\sin\left(\frac{a\_rhox\pi\,x}{L}\right)\\
&+u\_y^2\cos\left(\frac{a\_uy\pi\,y}{L}\right)^2\gamma\,rho\_y\cos\left(\frac{a\_rhoy\pi\,y}{L}\right)\\
&-2\,v\_0\,v\_x\cos\left(\frac{a\_vx\pi\,x}{L}\right)rho\_x\sin\left(\frac{a\_rhox\pi\,x}{L}\right)\\
&-2\,v\_0\,v\_x\cos\left(\frac{a\_vx\pi\,x}{L}\right)rho\_y\cos\left(\frac{a\_rhoy\pi\,y}{L}\right)\\
&-2\,v\_0\,v\_y\sin\left(\frac{a\_vy\pi\,y}{L}\right)rho\_x\sin\left(\frac{a\_rhox\pi\,x}{L}\right)\\
&-2\,v\_0\,v\_y\sin\left(\frac{a\_vy\pi\,y}{L}\right)rho\_y\cos\left(\frac{a\_rhoy\pi\,y}{L}\right)\\
&+\gamma\,v\_x^2\cos\left(\frac{a\_vx\pi\,x}{L}\right)^2rho\_x\sin\left(\frac{a\_rhox\pi\,x}{L}\right)\\
&+\gamma\,v\_x^2\cos\left(\frac{a\_vx\pi\,x}{L}\right)^2rho\_y\cos\left(\frac{a\_rhoy\pi\,y}{L}\right)\\
&+\gamma\,v\_y^2\sin\left(\frac{a\_vy\pi\,y}{L}\right)^2rho\_x\sin\left(\frac{a\_rhox\pi\,x}{L}\right)\\
&+\gamma\,v\_y^2\sin\left(\frac{a\_vy\pi\,y}{L}\right)^2rho\_y\cos\left(\frac{a\_rhoy\pi\,y}{L}\right)\\
&-2\,v\_x\cos\left(\frac{a\_vx\pi\,x}{L}\right)v\_y\sin\left(\frac{a\_vy\pi\,y}{L}\right)rho\_0\\
&+2\,\gamma\,v\_0\,v\_x\cos\left(\frac{a\_vx\pi\,x}{L}\right)rho\_0+2\,\gamma\,v\_0\,v\_y\sin\left(\frac{a\_vy\pi\,y}{L}\right)rho\_0\\
&+2\,u\_x\sin\left(\frac{a\_ux\pi\,x}{L}\right)u\_y\cos\left(\frac{a\_uy\pi\,y}{L}\right)\gamma\,rho\_0\\
&+2\,u\_0\,u\_x\sin\left(\frac{a\_ux\pi\,x}{L}\right)\gamma\,rho\_x\sin\left(\frac{a\_rhox\pi\,x}{L}\right)\\
&+2\,u\_0\,u\_x\sin\left(\frac{a\_ux\pi\,x}{L}\right)\gamma\,rho\_y\cos\left(\frac{a\_rhoy\pi\,y}{L}\right)\\
&+2\,u\_0\,u\_y\cos\left(\frac{a\_uy\pi\,y}{L}\right)\gamma\,rho\_x\sin\left(\frac{a\_rhox\pi\,x}{L}\right)\\
&+2\,u\_0\,u\_y\cos\left(\frac{a\_uy\pi\,y}{L}\right)\gamma\,rho\_y\cos\left(\frac{a\_rhoy\pi\,y}{L}\right)\\
&-2\,u\_x\sin\left(\frac{a\_ux\pi\,x}{L}\right)u\_y\cos\left(\frac{a\_uy\pi\,y}{L}\right)rho\_x\sin\left(\frac{a\_rhox\pi\,x}{L}\right)
\end{aligned}
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\begin{aligned}
&-2\,u\_x\sin\left(\frac{a\_ux\pi\,x}{L}\right)u\_y\cos\left(\frac{a\_uy\pi\,y}{L}\right)rho\_y\cos\left(\frac{a\_rhoy\pi\,y}{L}\right)\\
&-2\,v\_x\cos\left(\frac{a\_vx\pi\,x}{L}\right)v\_y\sin\left(\frac{a\_vy\pi\,y}{L}\right)rho\_x\sin\left(\frac{a\_rhox\pi\,x}{L}\right)\\
&-2\,v\_x\cos\left(\frac{a\_vx\pi\,x}{L}\right)v\_y\sin\left(\frac{a\_vy\pi\,y}{L}\right)rho\_y\cos\left(\frac{a\_rhoy\pi\,y}{L}\right)\\
&+2\,\gamma\,v\_0\,v\_x\cos\left(\frac{a\_vx\pi\,x}{L}\right)rho\_x\sin\left(\frac{a\_rhox\pi\,x}{L}\right)\\
&+2\,\gamma\,v\_0\,v\_x\cos\left(\frac{a\_vx\pi\,x}{L}\right)rho\_y\cos\left(\frac{a\_rhoy\pi\,y}{L}\right)\\
&+2\,\gamma\,v\_0\,v\_y\sin\left(\frac{a\_vy\pi\,y}{L}\right)rho\_x\sin\left(\frac{a\_rhox\pi\,x}{L}\right)\\
&+2\,\gamma\,v\_0\,v\_y\sin\left(\frac{a\_vy\pi\,y}{L}\right)rho\_y\cos\left(\frac{a\_rhoy\pi\,y}{L}\right)\\
&+2\,\gamma\,v\_x\cos\left(\frac{a\_vx\pi\,x}{L}\right)v\_y\sin\left(\frac{a\_vy\pi\,y}{L}\right)rho\_0\\
&-2\,u\_0\,u\_x\sin\left(\frac{a\_ux\pi\,x}{L}\right)rho\_0-2\,u\_0\,u\_y\cos\left(\frac{a\_uy\pi\,y}{L}\right)rho\_0\\
&+u\_x^2\sin\left(\frac{a\_ux\pi\,x}{L}\right)^2\gamma\,rho\_0+u\_y^2\cos\left(\frac{a\_uy\pi\,y}{L}\right)^2\gamma\,rho\_0\\
&+u\_0^2\,\gamma\,rho\_x\sin\left(\frac{a\_rhox\pi\,x}{L}\right)+u\_0^2\,\gamma\,rho\_y\cos\left(\frac{a\_rhoy\pi\,y}{L}\right)\\
&-u\_x^2\sin\left(\frac{a\_ux\pi\,x}{L}\right)^2rho\_x\sin\left(\frac{a\_rhox\pi\,x}{L}\right)\\
&-u\_x^2\sin\left(\frac{a\_ux\pi\,x}{L}\right)^2rho\_y\cos\left(\frac{a\_rhoy\pi\,y}{L}\right)\\
&-u\_y^2\cos\left(\frac{a\_uy\pi\,y}{L}\right)^2rho\_x\sin\left(\frac{a\_rhox\pi\,x}{L}\right)\\
&-u\_y^2\cos\left(\frac{a\_uy\pi\,y}{L}\right)^2rho\_y\cos\left(\frac{a\_rhoy\pi\,y}{L}\right)\\
&-v\_x^2\cos\left(\frac{a\_vx\pi\,x}{L}\right)^2rho\_x\sin\left(\frac{a\_rhox\pi\,x}{L}\right)\\
&-v\_x^2\cos\left(\frac{a\_vx\pi\,x}{L}\right)^2rho\_y\cos\left(\frac{a\_rhoy\pi\,y}{L}\right)\\
&-v\_y^2\sin\left(\frac{a\_vy\pi\,y}{L}\right)^2rho\_x\sin\left(\frac{a\_rhox\pi\,x}{L}\right)\\
&-v\_y^2\sin\left(\frac{a\_vy\pi\,y}{L}\right)^2rho\_y\cos\left(\frac{a\_rhoy\pi\,y}{L}\right)\\
&+\gamma\,v\_0^2\,rho\_x\sin\left(\frac{a\_rhox\pi\,x}{L}\right)+\gamma\,v\_0^2\,rho\_y\cos\left(\frac{a\_rhoy\pi\,y}{L}\right)
\end{aligned}
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\begin{aligned}
&-2\,v\_0\,v\_x\cos\left(\frac{a\_vx\,\pi\,x}{L}\right)\,rho\_0-2\,v\_0\,v\_y\sin\left(\frac{a\_vy\,\pi\,y}{L}\right)\,rho\_0\\
&+\gamma\,v\_x^2\cos\left(\frac{a\_vx\,\pi\,x}{L}\right)^2\,rho\_0+\gamma\,v\_y^2\sin\left(\frac{a\_vy\,\pi\,y}{L}\right)^2\,rho\_0\Bigg)\Bigg)+\Bigg(\Bigg(u\_0\\
&+u\_x\sin\left(\frac{a\_ux\,\pi\,x}{L}\right)+u\_y\cos\left(\frac{a\_uy\,\pi\,y}{L}\right)\Bigg)\\
&\left(\pi\,u\_x\cos\left(\frac{a\_ux\,\pi\,x}{L}\right)\,a\_ux\,u\_0\,\gamma\,rho\_0^2\right.\\
&-\pi\,u\_x\cos\left(\frac{a\_ux\,\pi\,x}{L}\right)\,a\_ux\,u\_0\,rho\_x^2\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)^2\\
&-\pi\,u\_x\cos\left(\frac{a\_ux\,\pi\,x}{L}\right)\,a\_ux\,u\_0\,rho\_y^2\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)^2\\
&+\pi\,u\_x^2\cos\left(\frac{a\_ux\,\pi\,x}{L}\right)\,a\_ux\sin\left(\frac{a\_ux\,\pi\,x}{L}\right)\,\gamma\,rho\_0^2\\
&-\pi\,u\_x^2\cos\left(\frac{a\_ux\,\pi\,x}{L}\right)\,a\_ux\sin\left(\frac{a\_ux\,\pi\,x}{L}\right)\,rho\_x^2\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)^2\\
&-\pi\,u\_x^2\cos\left(\frac{a\_ux\,\pi\,x}{L}\right)\,a\_ux\sin\left(\frac{a\_ux\,\pi\,x}{L}\right)\,rho\_y^2\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)^2\\
&-\pi\,u\_x\cos\left(\frac{a\_ux\,\pi\,x}{L}\right)\,a\_ux\,u\_y\cos\left(\frac{a\_uy\,\pi\,y}{L}\right)\,rho\_0^2\\
&+\pi\,v\_x\sin\left(\frac{a\_vx\,\pi\,x}{L}\right)\,a\_vx\,v\_0\,rho\_x^2\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)^2\\
&+\pi\,v\_x\sin\left(\frac{a\_vx\,\pi\,x}{L}\right)\,a\_vx\,v\_0\,rho\_y^2\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)^2\\
&+\pi\,v\_x^2\sin\left(\frac{a\_vx\,\pi\,x}{L}\right)\,a\_vx\cos\left(\frac{a\_vx\,\pi\,x}{L}\right)\,rho\_x^2\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)^2\\
&+\pi\,v\_x^2\sin\left(\frac{a\_vx\,\pi\,x}{L}\right)\,a\_vx\cos\left(\frac{a\_vx\,\pi\,x}{L}\right)\,rho\_y^2\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)^2\\
&+\pi\,v\_x\sin\left(\frac{a\_vx\,\pi\,x}{L}\right)\,a\_vx\,v\_y\sin\left(\frac{a\_vy\,\pi\,y}{L}\right)\,rho\_0^2\\
&-\pi\,v\_x\sin\left(\frac{a\_vx\,\pi\,x}{L}\right)\,a\_vx\,\gamma\,v\_0\,rho\_0^2\\
&-\pi\,v\_x^2\sin\left(\frac{a\_vx\,\pi\,x}{L}\right)\,a\_vx\,\gamma\cos\left(\frac{a\_vx\,\pi\,x}{L}\right)\,rho\_0^2\\
&-p\_x\sin\left(\frac{a\_px\,\pi\,x}{L}\right)\,a\_px\,\pi\,rho\_0-\pi\,u\_x\cos\left(\frac{a\_ux\,\pi\,x}{L}\right)\,a\_ux\,u\_0\,rho\_0^2\\
&-\pi\,u\_x^2\cos\left(\frac{a\_ux\,\pi\,x}{L}\right)\,a\_ux\sin\left(\frac{a\_ux\,\pi\,x}{L}\right)\,rho\_0^2\\
&+\pi\,v\_x\sin\left(\frac{a\_vx\,\pi\,x}{L}\right)\,a\_vx\,v\_0\,rho\_0^2
\end{aligned}
$$

$$
\begin{aligned}
&+\pi\, v\_x^2 \sin\left(\frac{a\_vx\,\pi\, x}{L}\right) a\_vx \cos\left(\frac{a\_vx\,\pi\, x}{L}\right) rho\_0^2 \\
&-p\_x \sin\left(\frac{a\_px\,\pi\, x}{L}\right) a\_px\,\pi\, rho\_y \cos\left(\frac{a\_rhoy\,\pi\, y}{L}\right) \\
&+\pi\, u\_x \cos\left(\frac{a\_ux\,\pi\, x}{L}\right) a\_ux\, u\_0\, \gamma\, rho\_x^2 \sin\left(\frac{a\_rhox\,\pi\, x}{L}\right)^2 \\
&+\pi\, u\_x \cos\left(\frac{a\_ux\,\pi\, x}{L}\right) a\_ux\, u\_0\, \gamma\, rho\_y^2 \cos\left(\frac{a\_rhoy\,\pi\, y}{L}\right)^2 \\
&+\pi\, u\_x^2 \cos\left(\frac{a\_ux\,\pi\, x}{L}\right) a\_ux \sin\left(\frac{a\_ux\,\pi\, x}{L}\right) \gamma\, rho\_x^2 \sin\left(\frac{a\_rhox\,\pi\, x}{L}\right)^2 \\
&+\pi\, u\_x^2 \cos\left(\frac{a\_ux\,\pi\, x}{L}\right) a\_ux \sin\left(\frac{a\_ux\,\pi\, x}{L}\right) \gamma\, rho\_y^2 \cos\left(\frac{a\_rhoy\,\pi\, y}{L}\right)^2 \\
&+\pi\, u\_x \cos\left(\frac{a\_ux\,\pi\, x}{L}\right) a\_ux\, u\_y \cos\left(\frac{a\_uy\,\pi\, y}{L}\right) \gamma\, rho\_0^2 \\
&-\pi\, u\_x \cos\left(\frac{a\_ux\,\pi\, x}{L}\right) a\_ux\, u\_y \cos\left(\frac{a\_uy\,\pi\, y}{L}\right) rho\_x^2 \sin\left(\frac{a\_rhox\,\pi\, x}{L}\right)^2 \\
&-\pi\, u\_x \cos\left(\frac{a\_ux\,\pi\, x}{L}\right) a\_ux\, u\_y \cos\left(\frac{a\_uy\,\pi\, y}{L}\right) rho\_y^2 \cos\left(\frac{a\_rhoy\,\pi\, y}{L}\right)^2 \\
&+\pi\, v\_x \sin\left(\frac{a\_vx\,\pi\, x}{L}\right) a\_vx\, v\_y \sin\left(\frac{a\_vy\,\pi\, y}{L}\right) rho\_x^2 \sin\left(\frac{a\_rhox\,\pi\, x}{L}\right)^2 \\
&+\pi\, v\_x \sin\left(\frac{a\_vx\,\pi\, x}{L}\right) a\_vx\, v\_y \sin\left(\frac{a\_vy\,\pi\, y}{L}\right) rho\_y^2 \cos\left(\frac{a\_rhoy\,\pi\, y}{L}\right)^2 \\
&-\pi\, v\_x \sin\left(\frac{a\_vx\,\pi\, x}{L}\right) a\_vx\, \gamma\, v\_0\, rho\_x^2 \sin\left(\frac{a\_rhox\,\pi\, x}{L}\right)^2 \\
&-\pi\, v\_x \sin\left(\frac{a\_vx\,\pi\, x}{L}\right) a\_vx\, \gamma\, v\_0\, rho\_y^2 \cos\left(\frac{a\_rhoy\,\pi\, y}{L}\right)^2 \\
&-\pi\, v\_x^2 \sin\left(\frac{a\_vx\,\pi\, x}{L}\right) a\_vx\, \gamma \cos\left(\frac{a\_vx\,\pi\, x}{L}\right) rho\_x^2 \sin\left(\frac{a\_rhox\,\pi\, x}{L}\right)^2 \\
&-\pi\, v\_x^2 \sin\left(\frac{a\_vx\,\pi\, x}{L}\right) a\_vx\, \gamma \cos\left(\frac{a\_vx\,\pi\, x}{L}\right) rho\_y^2 \cos\left(\frac{a\_rhoy\,\pi\, y}{L}\right)^2 \\
&-\pi\, v\_x \sin\left(\frac{a\_vx\,\pi\, x}{L}\right) a\_vx\, \gamma\, v\_y \sin\left(\frac{a\_vy\,\pi\, y}{L}\right) rho\_0^2 \\
&-2\,\pi\, u\_x \cos\left(\frac{a\_ux\,\pi\, x}{L}\right) a\_ux\, u\_0\, rho\_0\, rho\_x \sin\left(\frac{a\_rhox\,\pi\, x}{L}\right) \\
&-2\,\pi\, u\_x \cos\left(\frac{a\_ux\,\pi\, x}{L}\right) a\_ux\, u\_0\, rho\_0\, rho\_y \cos\left(\frac{a\_rhoy\,\pi\, y}{L}\right) \\
&-2\,\pi\, u\_x^2 \cos\left(\frac{a\_ux\,\pi\, x}{L}\right) a\_ux \sin\left(\frac{a\_ux\,\pi\, x}{L}\right) rho\_0\, rho\_x \sin\left(\frac{a\_rhox\,\pi\, x}{L}\right) \\
&-2\,\pi\, u\_x^2 \cos\left(\frac{a\_ux\,\pi\, x}{L}\right) a\_ux \sin\left(\frac{a\_ux\,\pi\, x}{L}\right) rho\_0\, rho\_y \cos\left(\frac{a\_rhoy\,\pi\, y}{L}\right)
\end{aligned}
$$

$$+2\,\pi\,v\_x\sin\left(\frac{a\_vx\,\pi\,x}{L}\right)\,a\_vx\,v\_0\,rho\_0\,rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)$$

$$+2\,\pi\,v\_x\sin\left(\frac{a\_vx\,\pi\,x}{L}\right)\,a\_vx\,v\_0\,rho\_0\,rho\_y\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)$$

$$+2\,\pi\,v\_x^2\sin\left(\frac{a\_vx\,\pi\,x}{L}\right)\,a\_vx\cos\left(\frac{a\_vx\,\pi\,x}{L}\right)\,rho\_0\,rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)$$

$$+2\,\pi\,v\_x^2\sin\left(\frac{a\_vx\,\pi\,x}{L}\right)\,a\_vx\cos\left(\frac{a\_vx\,\pi\,x}{L}\right)\,rho\_0\,rho\_y\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)$$

$$+2\,\pi\,u\_x\cos\left(\frac{a\_ux\,\pi\,x}{L}\right)\,a\_ux\,u\_0\,\gamma\,rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)\,rho\_0$$

$$+2\,\pi\,u\_x\cos\left(\frac{a\_ux\,\pi\,x}{L}\right)\,a\_ux\,u\_0\,\gamma\,rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)\,rho\_y$$

$$\cos\left(1\Big/\left(\frac{L}{a\_rhoy\,\pi\,y}\right)\right)$$

$$+2\,\pi\,u\_x\cos\left(\frac{a\_ux\,\pi\,x}{L}\right)\,a\_ux\,u\_0\,\gamma\,rho\_y\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)\,rho\_0$$

$$+2\,\pi\,u\_x^2\cos\left(\frac{a\_ux\,\pi\,x}{L}\right)\,a\_ux\sin\left(\frac{a\_ux\,\pi\,x}{L}\right)\,\gamma\,rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)\,rho\_0$$

$$+2\,\pi\,u\_x^2\cos\left(\frac{a\_ux\,\pi\,x}{L}\right)\,a\_ux\sin\left(\frac{a\_ux\,\pi\,x}{L}\right)\,\gamma\,rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)\,rho\_y$$

$$\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)$$

$$+2\,\pi\,u\_x^2\cos\left(\frac{a\_ux\,\pi\,x}{L}\right)\,a\_ux\sin\left(\frac{a\_ux\,\pi\,x}{L}\right)\,\gamma\,rho\_y\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)\,rho\_0$$

$$+2\,\pi\,u\_x\cos\left(\frac{a\_ux\,\pi\,x}{L}\right)\,a\_ux\,u\_y\cos\left(\frac{a\_uy\,\pi\,y}{L}\right)\,\gamma\,rho\_0\,rho\_x\sin(1$$

$$\Big/(L)\,(a\_rhox\,\pi\,x))$$

$$+2\,\pi\,u\_x\cos\left(\frac{a\_ux\,\pi\,x}{L}\right)\,a\_ux\,u\_y\cos\left(\frac{a\_uy\,\pi\,y}{L}\right)\,\gamma\,rho\_0\,rho\_y\cos(1$$

$$\Big/(L)\,(a\_rhoy\,\pi\,y))$$

$$-2\,\pi\,u\_x\cos\left(\frac{a\_ux\,\pi\,x}{L}\right)\,a\_ux\,u\_y\cos\left(\frac{a\_uy\,\pi\,y}{L}\right)\,rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)$$

$$rho\_0$$

$$-2\,\pi\,u\_x\cos\left(\frac{a\_ux\,\pi\,x}{L}\right)\,a\_ux\,u\_y\cos\left(\frac{a\_uy\,\pi\,y}{L}\right)\,rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)$$

$$rho\_y\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)$$

$$-2\,\pi\,u\_x\cos\left(\frac{a\_ux\,\pi\,x}{L}\right)\,a\_ux\,u\_y\cos\left(\frac{a\_uy\,\pi\,y}{L}\right)\,rho\_y\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)$$

$$rho\_0$$

$$+2\,\pi\,v\_x\sin\left(\frac{a\_vx\,\pi\,x}{L}\right)\,a\_vx\,v\_y\sin\left(\frac{a\_vy\,\pi\,y}{L}\right)\,rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)$$

$$rho\_0$$

$$+2\,\pi\,v\_x\sin\left(\frac{a\_vx\,\pi\,x}{L}\right)\,a\_vx\,v\_y\sin\left(\frac{a\_vy\,\pi\,y}{L}\right)\,rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)$$

$$rho\_y\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)$$

$$+2\,\pi\,v\_x\sin\left(\frac{a\_vx\,\pi\,x}{L}\right)\,a\_vx\,v\_y\sin\left(\frac{a\_vy\,\pi\,y}{L}\right)\,rho\_y\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)$$

$$rho\_0-2\,\pi\,v\_x\sin\left(\frac{a\_vx\,\pi\,x}{L}\right)\,a\_vx\,\gamma\,v\_0\,rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)\,rho\_0$$

$$-2\,\pi\,v\_x\sin\left(\frac{a\_vx\,\pi\,x}{L}\right)\,a\_vx\,\gamma\,v\_0\,rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)\,rho\_y$$

$$\cos\left(1/\left(\frac{L}{a\_rhoy\,\pi\,y}\right)\right)$$

$$-2\,\pi\,v\_x\sin\left(\frac{a\_vx\,\pi\,x}{L}\right)\,a\_vx\,\gamma\,v\_0\,rho\_y\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)\,rho\_0$$

$$-2\,\pi\,v\_x^2\,\sin\left(\frac{a\_vx\,\pi\,x}{L}\right)\,a\_vx\,\gamma\cos\left(\frac{a\_vx\,\pi\,x}{L}\right)\,rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)\,rho\_0$$

$$-2\,\pi\,v\_x^2\,\sin\left(\frac{a\_vx\,\pi\,x}{L}\right)\,a\_vx\,\gamma\cos\left(\frac{a\_vx\,\pi\,x}{L}\right)\,rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)\,rho\_y$$

$$\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)$$

$$-2\,\pi\,v\_x^2\,\sin\left(\frac{a\_vx\,\pi\,x}{L}\right)\,a\_vx\,\gamma\cos\left(\frac{a\_vx\,\pi\,x}{L}\right)\,rho\_y\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)\,rho\_0$$

$$-2\,\pi\,v\_x\sin\left(\frac{a\_vx\,\pi\,x}{L}\right)\,a\_vx\,\gamma\,v\_y\sin\left(\frac{a\_vy\,\pi\,y}{L}\right)\,rho\_0\,rho\_x\sin(1/$$

$$(L)\,(a\_rhox\,\pi\,x))$$

$$-2\,\pi\,v\_x\sin\left(\frac{a\_vx\,\pi\,x}{L}\right)\,a\_vx\,\gamma\,v\_y\sin\left(\frac{a\_vy\,\pi\,y}{L}\right)\,rho\_0\,rho\_y\cos(1/$$

$$(L)\,(a\_rhoy\,\pi\,y))$$

$$-2\,\pi\,u\_x\cos\left(\frac{a\_ux\,\pi\,x}{L}\right)\,a\_ux\,u\_0\,rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)\,rho\_y\cos(1$$

$$/\left(L\right)\left(a\_rhoy\,\pi\,y\right)\Big)$$

$$-2\,\pi\,u\_x^2\cos\left(\frac{a\_ux\,\pi\,x}{L}\right)a\_ux\sin\left(\frac{a\_ux\,\pi\,x}{L}\right)rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)rho\_y\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)$$

$$+2\,\pi\,v\_x\sin\left(\frac{a\_vx\,\pi\,x}{L}\right)a\_vx\,v\_0\,rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)rho\_y\cos\left(1/\left(L\right)\left(a\_rhoy\,\pi\,y\right)\right)$$

$$+2\,\pi\,v\_x^2\sin\left(\frac{a\_vx\,\pi\,x}{L}\right)a\_vx\cos\left(\frac{a\_vx\,\pi\,x}{L}\right)rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)rho\_y\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)$$

$$+\pi\,u\_x\cos\left(\frac{a\_ux\,\pi\,x}{L}\right)a\_ux\,u\_y\cos\left(\frac{a\_uy\,\pi\,y}{L}\right)\gamma\,rho\_x^2\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)^2$$

$$+2\,\pi\,u\_x\cos\left(\frac{a\_ux\,\pi\,x}{L}\right)a\_ux\,u\_y\cos\left(\frac{a\_uy\,\pi\,y}{L}\right)\gamma\,rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)rho\_y\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)$$

$$+\pi\,u\_x\cos\left(\frac{a\_ux\,\pi\,x}{L}\right)a\_ux\,u\_y\cos\left(\frac{a\_uy\,\pi\,y}{L}\right)\gamma\,rho\_y^2\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)^2$$

$$-\pi\,v\_x\sin\left(\frac{a\_vx\,\pi\,x}{L}\right)a\_vx\,\gamma\,v\_y\sin\left(\frac{a\_vy\,\pi\,y}{L}\right)rho\_x^2\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)^2$$

$$-2\,\pi\,v\_x\sin\left(\frac{a\_vx\,\pi\,x}{L}\right)a\_vx\,\gamma\,v\_y\sin\left(\frac{a\_vy\,\pi\,y}{L}\right)rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)rho\_y\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)$$

$$-\pi\,v\_x\sin\left(\frac{a\_vx\,\pi\,x}{L}\right)a\_vx\,\gamma\,v\_y\sin\left(\frac{a\_vy\,\pi\,y}{L}\right)rho\_y^2\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)^2$$

$$-p\_x\sin\left(\frac{a\_px\,\pi\,x}{L}\right)a\_px\,\pi\,rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)$$

$$-rho\_x\cos\left(\frac{a\_rhox\,\pi\,x}{L}\right)a\_rhox\,\pi\,p\_0$$

$$-rho\_x\cos\left(\frac{a\_rhox\,\pi\,x}{L}\right)a\_rhox\,\pi\,p\_x\cos\left(\frac{a\_px\,\pi\,x}{L}\right)$$

$$-rho\_x\cos\left(\frac{a\_rhox\,\pi\,x}{L}\right)a\_rhox\,\pi\,p\_y\sin\left(\frac{a\_py\,\pi\,y}{L}\right)\Big)\Big)\Big/\Big((\gamma-1)\,L\left(rho\_0+rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)+rho\_y\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)\right)\Big)$$

$$
\begin{aligned}
&-\frac{1}{2}\left(rho\_y\sin\left(\frac{a\_rhoy\pi y}{L}\right)a\_rhoy\pi\left(v\_0+v\_x\cos\left(\frac{a\_vx\pi x}{L}\right)\right.\right.\\
&\left.\left.+v\_y\sin\left(\frac{a\_vy\pi y}{L}\right)\right)\right)\left(2\,p\_x\cos\left(\frac{a\_px\pi x}{L}\right)+2\,p\_y\sin\left(\frac{a\_py\pi y}{L}\right)+2\,p\_0\right.\\
&+2\,u\_x\sin\left(\frac{a\_ux\pi x}{L}\right)u\_y\cos\left(\frac{a\_uy\pi y}{L}\right)\gamma\,rho\_x\sin\left(\frac{a\_rhox\pi x}{L}\right)\\
&+2\,u\_x\sin\left(\frac{a\_ux\pi x}{L}\right)u\_y\cos\left(\frac{a\_uy\pi y}{L}\right)\gamma\,rho\_y\cos\left(\frac{a\_rhoy\pi y}{L}\right)\\
&+2\,\gamma\,v\_x\cos\left(\frac{a\_vx\pi x}{L}\right)v\_y\sin\left(\frac{a\_vy\pi y}{L}\right)rho\_x\sin\left(\frac{a\_rhox\pi x}{L}\right)\\
&+2\,\gamma\,v\_x\cos\left(\frac{a\_vx\pi x}{L}\right)v\_y\sin\left(\frac{a\_vy\pi y}{L}\right)rho\_y\cos\left(\frac{a\_rhoy\pi y}{L}\right)\\
&-u\_0^2\,rho\_0-v\_0^2\,rho\_0+u\_0^2\,\gamma\,rho\_0-u\_x^2\sin\left(\frac{a\_ux\pi x}{L}\right)^2rho\_0\\
&-u\_y^2\cos\left(\frac{a\_uy\pi y}{L}\right)^2rho\_0-u\_0^2\,rho\_x\sin\left(\frac{a\_rhox\pi x}{L}\right)\\
&-u\_0^2\,rho\_y\cos\left(\frac{a\_rhoy\pi y}{L}\right)-v\_x^2\cos\left(\frac{a\_vx\pi x}{L}\right)^2rho\_0\\
&-v\_y^2\sin\left(\frac{a\_vy\pi y}{L}\right)^2rho\_0+\gamma\,v\_0^2\,rho\_0-v\_0^2\,rho\_x\sin\left(\frac{a\_rhox\pi x}{L}\right)\\
&-v\_0^2\,rho\_y\cos\left(\frac{a\_rhoy\pi y}{L}\right)\\
&-2\,u\_0\,u\_x\sin\left(\frac{a\_ux\pi x}{L}\right)rho\_x\sin\left(\frac{a\_rhox\pi x}{L}\right)\\
&-2\,u\_0\,u\_x\sin\left(\frac{a\_ux\pi x}{L}\right)rho\_y\cos\left(\frac{a\_rhoy\pi y}{L}\right)\\
&-2\,u\_0\,u\_y\cos\left(\frac{a\_uy\pi y}{L}\right)rho\_x\sin\left(\frac{a\_rhox\pi x}{L}\right)\\
&-2\,u\_0\,u\_y\cos\left(\frac{a\_uy\pi y}{L}\right)rho\_y\cos\left(\frac{a\_rhoy\pi y}{L}\right)\\
&+u\_x^2\sin\left(\frac{a\_ux\pi x}{L}\right)^2\gamma\,rho\_x\sin\left(\frac{a\_rhox\pi x}{L}\right)\\
&+u\_x^2\sin\left(\frac{a\_ux\pi x}{L}\right)^2\gamma\,rho\_y\cos\left(\frac{a\_rhoy\pi y}{L}\right)\\
&+2\,u\_0\,u\_x\sin\left(\frac{a\_ux\pi x}{L}\right)\gamma\,rho\_0+2\,u\_0\,u\_y\cos\left(\frac{a\_uy\pi y}{L}\right)\gamma\,rho\_0\\
&-2\,u\_x\sin\left(\frac{a\_ux\pi x}{L}\right)u\_y\cos\left(\frac{a\_uy\pi y}{L}\right)rho\_0\\
&+u\_y^2\cos\left(\frac{a\_uy\pi y}{L}\right)^2\gamma\,rho\_x\sin\left(\frac{a\_rhox\pi x}{L}\right)
\end{aligned}
$$

$$
\begin{aligned}
&+ u\_y^2 \cos\left(\frac{a\_uy\pi y}{L}\right)^2 \gamma\, rho\_y \cos\left(\frac{a\_rhoy\pi y}{L}\right)\\
&- 2\, v\_0\, v\_x \cos\left(\frac{a\_vx\pi x}{L}\right) rho\_x \sin\left(\frac{a\_rhox\pi x}{L}\right)\\
&- 2\, v\_0\, v\_x \cos\left(\frac{a\_vx\pi x}{L}\right) rho\_y \cos\left(\frac{a\_rhoy\pi y}{L}\right)\\
&- 2\, v\_0\, v\_y \sin\left(\frac{a\_vy\pi y}{L}\right) rho\_x \sin\left(\frac{a\_rhox\pi x}{L}\right)\\
&- 2\, v\_0\, v\_y \sin\left(\frac{a\_vy\pi y}{L}\right) rho\_y \cos\left(\frac{a\_rhoy\pi y}{L}\right)\\
&+ \gamma\, v\_x^2 \cos\left(\frac{a\_vx\pi x}{L}\right)^2 rho\_x \sin\left(\frac{a\_rhox\pi x}{L}\right)\\
&+ \gamma\, v\_x^2 \cos\left(\frac{a\_vx\pi x}{L}\right)^2 rho\_y \cos\left(\frac{a\_rhoy\pi y}{L}\right)\\
&+ \gamma\, v\_y^2 \sin\left(\frac{a\_vy\pi y}{L}\right)^2 rho\_x \sin\left(\frac{a\_rhox\pi x}{L}\right)\\
&+ \gamma\, v\_y^2 \sin\left(\frac{a\_vy\pi y}{L}\right)^2 rho\_y \cos\left(\frac{a\_rhoy\pi y}{L}\right)\\
&- 2\, v\_x \cos\left(\frac{a\_vx\pi x}{L}\right) v\_y \sin\left(\frac{a\_vy\pi y}{L}\right) rho\_0\\
&+ 2\, \gamma\, v\_0\, v\_x \cos\left(\frac{a\_vx\pi x}{L}\right) rho\_0 + 2\, \gamma\, v\_0\, v\_y \sin\left(\frac{a\_vy\pi y}{L}\right) rho\_0\\
&+ 2\, u\_x \sin\left(\frac{a\_ux\pi x}{L}\right) u\_y \cos\left(\frac{a\_uy\pi y}{L}\right) \gamma\, rho\_0\\
&+ 2\, u\_0\, u\_x \sin\left(\frac{a\_ux\pi x}{L}\right) \gamma\, rho\_x \sin\left(\frac{a\_rhox\pi x}{L}\right)\\
&+ 2\, u\_0\, u\_x \sin\left(\frac{a\_ux\pi x}{L}\right) \gamma\, rho\_y \cos\left(\frac{a\_rhoy\pi y}{L}\right)\\
&+ 2\, u\_0\, u\_y \cos\left(\frac{a\_uy\pi y}{L}\right) \gamma\, rho\_x \sin\left(\frac{a\_rhox\pi x}{L}\right)\\
&+ 2\, u\_0\, u\_y \cos\left(\frac{a\_uy\pi y}{L}\right) \gamma\, rho\_y \cos\left(\frac{a\_rhoy\pi y}{L}\right)\\
&- 2\, u\_x \sin\left(\frac{a\_ux\pi x}{L}\right) u\_y \cos\left(\frac{a\_uy\pi y}{L}\right) rho\_x \sin\left(\frac{a\_rhox\pi x}{L}\right)\\
&- 2\, u\_x \sin\left(\frac{a\_ux\pi x}{L}\right) u\_y \cos\left(\frac{a\_uy\pi y}{L}\right) rho\_y \cos\left(\frac{a\_rhoy\pi y}{L}\right)\\
&- 2\, v\_x \cos\left(\frac{a\_vx\pi x}{L}\right) v\_y \sin\left(\frac{a\_vy\pi y}{L}\right) rho\_x \sin\left(\frac{a\_rhox\pi x}{L}\right)\\
&- 2\, v\_x \cos\left(\frac{a\_vx\pi x}{L}\right) v\_y \sin\left(\frac{a\_vy\pi y}{L}\right) rho\_y \cos\left(\frac{a\_rhoy\pi y}{L}\right)
\end{aligned}
$$

$$
\begin{aligned}
&+2\,\gamma\,v\_0\,v\_x\cos\left(\frac{a\_vx\,\pi\,x}{L}\right)\,rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)\\
&+2\,\gamma\,v\_0\,v\_x\cos\left(\frac{a\_vx\,\pi\,x}{L}\right)\,rho\_y\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)\\
&+2\,\gamma\,v\_0\,v\_y\sin\left(\frac{a\_vy\,\pi\,y}{L}\right)\,rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)\\
&+2\,\gamma\,v\_0\,v\_y\sin\left(\frac{a\_vy\,\pi\,y}{L}\right)\,rho\_y\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)\\
&+2\,\gamma\,v\_x\cos\left(\frac{a\_vx\,\pi\,x}{L}\right)\,v\_y\sin\left(\frac{a\_vy\,\pi\,y}{L}\right)\,rho\_0\\
&-2\,u\_0\,u\_x\sin\left(\frac{a\_ux\,\pi\,x}{L}\right)\,rho\_0-2\,u\_0\,u\_y\cos\left(\frac{a\_uy\,\pi\,y}{L}\right)\,rho\_0\\
&+u\_x^2\sin\left(\frac{a\_ux\,\pi\,x}{L}\right)^2\gamma\,rho\_0+u\_y^2\cos\left(\frac{a\_uy\,\pi\,y}{L}\right)^2\gamma\,rho\_0\\
&+u\_0^2\,\gamma\,rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)+u\_0^2\,\gamma\,rho\_y\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)\\
&-u\_x^2\sin\left(\frac{a\_ux\,\pi\,x}{L}\right)^2\,rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)\\
&-u\_x^2\sin\left(\frac{a\_ux\,\pi\,x}{L}\right)^2\,rho\_y\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)\\
&-u\_y^2\cos\left(\frac{a\_uy\,\pi\,y}{L}\right)^2\,rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)\\
&-u\_y^2\cos\left(\frac{a\_uy\,\pi\,y}{L}\right)^2\,rho\_y\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)\\
&-v\_x^2\cos\left(\frac{a\_vx\,\pi\,x}{L}\right)^2\,rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)\\
&-v\_x^2\cos\left(\frac{a\_vx\,\pi\,x}{L}\right)^2\,rho\_y\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)\\
&-v\_y^2\sin\left(\frac{a\_vy\,\pi\,y}{L}\right)^2\,rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)\\
&-v\_y^2\sin\left(\frac{a\_vy\,\pi\,y}{L}\right)^2\,rho\_y\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)\\
&+\gamma\,v\_0^2\,rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)+\gamma\,v\_0^2\,rho\_y\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)\\
&-2\,v\_0\,v\_x\cos\left(\frac{a\_vx\,\pi\,x}{L}\right)\,rho\_0-2\,v\_0\,v\_y\sin\left(\frac{a\_vy\,\pi\,y}{L}\right)\,rho\_0\\
&+\gamma\,v\_x^2\cos\left(\frac{a\_vx\,\pi\,x}{L}\right)^2\,rho\_0+\gamma\,v\_y^2\sin\left(\frac{a\_vy\,\pi\,y}{L}\right)^2\,rho\_0\Bigg)\Bigg/\Bigg(L\,(\gamma\\
&-1)\,\left(rho\_0+rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)+rho\_y\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)\right)\Bigg)
\end{aligned}
$$

$$
\begin{aligned}
&+\frac{1}{2}\,\frac{1}{L\,(\gamma-1)}\left(v\_y\cos\left(\frac{a\_vy\,\pi\,y}{L}\right)a\_vy\,\pi\left(2\,p\_x\cos\left(\frac{a\_px\,\pi\,x}{L}\right)\right.\right.\\
&\left.+2\,p\_y\sin\left(\frac{a\_py\,\pi\,y}{L}\right)+2\,p\_0\right)\\
&+2\,u\_x\sin\left(\frac{a\_ux\,\pi\,x}{L}\right)u\_y\cos\left(\frac{a\_uy\,\pi\,y}{L}\right)\gamma\,rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)\\
&+2\,u\_x\sin\left(\frac{a\_ux\,\pi\,x}{L}\right)u\_y\cos\left(\frac{a\_uy\,\pi\,y}{L}\right)\gamma\,rho\_y\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)\\
&+2\,\gamma\,v\_x\cos\left(\frac{a\_vx\,\pi\,x}{L}\right)v\_y\sin\left(\frac{a\_vy\,\pi\,y}{L}\right)rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)\\
&+2\,\gamma\,v\_x\cos\left(\frac{a\_vx\,\pi\,x}{L}\right)v\_y\sin\left(\frac{a\_vy\,\pi\,y}{L}\right)rho\_y\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)\\
&-u\_0^2\,rho\_0-v\_0^2\,rho\_0+u\_0^2\,\gamma\,rho\_0-u\_x^2\sin\left(\frac{a\_ux\,\pi\,x}{L}\right)^2rho\_0\\
&-u\_y^2\cos\left(\frac{a\_uy\,\pi\,y}{L}\right)^2rho\_0-u\_0^2\,rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)\\
&-u\_0^2\,rho\_y\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)-v\_x^2\cos\left(\frac{a\_vx\,\pi\,x}{L}\right)^2rho\_0\\
&-v\_y^2\sin\left(\frac{a\_vy\,\pi\,y}{L}\right)^2rho\_0+\gamma\,v\_0^2\,rho\_0-v\_0^2\,rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)\\
&-v\_0^2\,rho\_y\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)\\
&-2\,u\_0\,u\_x\sin\left(\frac{a\_ux\,\pi\,x}{L}\right)rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)\\
&-2\,u\_0\,u\_x\sin\left(\frac{a\_ux\,\pi\,x}{L}\right)rho\_y\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)\\
&-2\,u\_0\,u\_y\cos\left(\frac{a\_uy\,\pi\,y}{L}\right)rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)\\
&-2\,u\_0\,u\_y\cos\left(\frac{a\_uy\,\pi\,y}{L}\right)rho\_y\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)\\
&+u\_x^2\sin\left(\frac{a\_ux\,\pi\,x}{L}\right)^2\gamma\,rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)\\
&+u\_x^2\sin\left(\frac{a\_ux\,\pi\,x}{L}\right)^2\gamma\,rho\_y\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)\\
&+2\,u\_0\,u\_x\sin\left(\frac{a\_ux\,\pi\,x}{L}\right)\gamma\,rho\_0+2\,u\_0\,u\_y\cos\left(\frac{a\_uy\,\pi\,y}{L}\right)\gamma\,rho\_0\\
&-2\,u\_x\sin\left(\frac{a\_ux\,\pi\,x}{L}\right)u\_y\cos\left(\frac{a\_uy\,\pi\,y}{L}\right)rho\_0\\
&+u\_y^2\cos\left(\frac{a\_uy\,\pi\,y}{L}\right)^2\gamma\,rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)
\end{aligned}
$$

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\begin{aligned}
&+ u\_y^2 \cos\left(\frac{a\_uy\pi y}{L}\right)^2 \gamma\, rho\_y \cos\left(\frac{a\_rhoy\pi y}{L}\right)\\
&- 2\, v\_0\, v\_x \cos\left(\frac{a\_vx\pi x}{L}\right) rho\_x \sin\left(\frac{a\_rhox\pi x}{L}\right)\\
&- 2\, v\_0\, v\_x \cos\left(\frac{a\_vx\pi x}{L}\right) rho\_y \cos\left(\frac{a\_rhoy\pi y}{L}\right)\\
&- 2\, v\_0\, v\_y \sin\left(\frac{a\_vy\pi y}{L}\right) rho\_x \sin\left(\frac{a\_rhox\pi x}{L}\right)\\
&- 2\, v\_0\, v\_y \sin\left(\frac{a\_vy\pi y}{L}\right) rho\_y \cos\left(\frac{a\_rhoy\pi y}{L}\right)\\
&+ \gamma\, v\_x^2 \cos\left(\frac{a\_vx\pi x}{L}\right)^2 rho\_x \sin\left(\frac{a\_rhox\pi x}{L}\right)\\
&+ \gamma\, v\_x^2 \cos\left(\frac{a\_vx\pi x}{L}\right)^2 rho\_y \cos\left(\frac{a\_rhoy\pi y}{L}\right)\\
&+ \gamma\, v\_y^2 \sin\left(\frac{a\_vy\pi y}{L}\right)^2 rho\_x \sin\left(\frac{a\_rhox\pi x}{L}\right)\\
&+ \gamma\, v\_y^2 \sin\left(\frac{a\_vy\pi y}{L}\right)^2 rho\_y \cos\left(\frac{a\_rhoy\pi y}{L}\right)\\
&- 2\, v\_x \cos\left(\frac{a\_vx\pi x}{L}\right) v\_y \sin\left(\frac{a\_vy\pi y}{L}\right) rho\_0\\
&+ 2\, \gamma\, v\_0\, v\_x \cos\left(\frac{a\_vx\pi x}{L}\right) rho\_0 + 2\, \gamma\, v\_0\, v\_y \sin\left(\frac{a\_vy\pi y}{L}\right) rho\_0\\
&+ 2\, u\_x \sin\left(\frac{a\_ux\pi x}{L}\right) u\_y \cos\left(\frac{a\_uy\pi y}{L}\right) \gamma\, rho\_0\\
&+ 2\, u\_0\, u\_x \sin\left(\frac{a\_ux\pi x}{L}\right) \gamma\, rho\_x \sin\left(\frac{a\_rhox\pi x}{L}\right)\\
&+ 2\, u\_0\, u\_x \sin\left(\frac{a\_ux\pi x}{L}\right) \gamma\, rho\_y \cos\left(\frac{a\_rhoy\pi y}{L}\right)\\
&+ 2\, u\_0\, u\_y \cos\left(\frac{a\_uy\pi y}{L}\right) \gamma\, rho\_x \sin\left(\frac{a\_rhox\pi x}{L}\right)\\
&+ 2\, u\_0\, u\_y \cos\left(\frac{a\_uy\pi y}{L}\right) \gamma\, rho\_y \cos\left(\frac{a\_rhoy\pi y}{L}\right)\\
&- 2\, u\_x \sin\left(\frac{a\_ux\pi x}{L}\right) u\_y \cos\left(\frac{a\_uy\pi y}{L}\right) rho\_x \sin\left(\frac{a\_rhox\pi x}{L}\right)\\
&- 2\, u\_x \sin\left(\frac{a\_ux\pi x}{L}\right) u\_y \cos\left(\frac{a\_uy\pi y}{L}\right) rho\_y \cos\left(\frac{a\_rhoy\pi y}{L}\right)\\
&- 2\, v\_x \cos\left(\frac{a\_vx\pi x}{L}\right) v\_y \sin\left(\frac{a\_vy\pi y}{L}\right) rho\_x \sin\left(\frac{a\_rhox\pi x}{L}\right)\\
&- 2\, v\_x \cos\left(\frac{a\_vx\pi x}{L}\right) v\_y \sin\left(\frac{a\_vy\pi y}{L}\right) rho\_y \cos\left(\frac{a\_rhoy\pi y}{L}\right)
\end{aligned}
$$

$$
\begin{aligned}
&+2\,\gamma\,v\_0\,v\_x\cos\left(\frac{a\_vx\,\pi\,x}{L}\right)\,rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)\\
&+2\,\gamma\,v\_0\,v\_x\cos\left(\frac{a\_vx\,\pi\,x}{L}\right)\,rho\_y\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)\\
&+2\,\gamma\,v\_0\,v\_y\sin\left(\frac{a\_vy\,\pi\,y}{L}\right)\,rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)\\
&+2\,\gamma\,v\_0\,v\_y\sin\left(\frac{a\_vy\,\pi\,y}{L}\right)\,rho\_y\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)\\
&+2\,\gamma\,v\_x\cos\left(\frac{a\_vx\,\pi\,x}{L}\right)\,v\_y\sin\left(\frac{a\_vy\,\pi\,y}{L}\right)\,rho\_0\\
&-2\,u\_0\,u\_x\sin\left(\frac{a\_ux\,\pi\,x}{L}\right)\,rho\_0-2\,u\_0\,u\_y\cos\left(\frac{a\_uy\,\pi\,y}{L}\right)\,rho\_0\\
&+u\_x^2\sin\left(\frac{a\_ux\,\pi\,x}{L}\right)^2\gamma\,rho\_0+u\_y^2\cos\left(\frac{a\_uy\,\pi\,y}{L}\right)^2\gamma\,rho\_0\\
&+u\_0^2\,\gamma\,rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)+u\_0^2\,\gamma\,rho\_y\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)\\
&-u\_x^2\sin\left(\frac{a\_ux\,\pi\,x}{L}\right)^2\,rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)\\
&-u\_x^2\sin\left(\frac{a\_ux\,\pi\,x}{L}\right)^2\,rho\_y\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)\\
&-u\_y^2\cos\left(\frac{a\_uy\,\pi\,y}{L}\right)^2\,rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)\\
&-u\_y^2\cos\left(\frac{a\_uy\,\pi\,y}{L}\right)^2\,rho\_y\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)\\
&-v\_x^2\cos\left(\frac{a\_vx\,\pi\,x}{L}\right)^2\,rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)\\
&-v\_x^2\cos\left(\frac{a\_vx\,\pi\,x}{L}\right)^2\,rho\_y\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)\\
&-v\_y^2\sin\left(\frac{a\_vy\,\pi\,y}{L}\right)^2\,rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)\\
&-v\_y^2\sin\left(\frac{a\_vy\,\pi\,y}{L}\right)^2\,rho\_y\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)\\
&+\gamma\,v\_0^2\,rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)+\gamma\,v\_0^2\,rho\_y\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)\\
&-2\,v\_0\,v\_x\cos\left(\frac{a\_vx\,\pi\,x}{L}\right)\,rho\_0-2\,v\_0\,v\_y\sin\left(\frac{a\_vy\,\pi\,y}{L}\right)\,rho\_0\\
&+\gamma\,v\_x^2\cos\left(\frac{a\_vx\,\pi\,x}{L}\right)^2\,rho\_0+\gamma\,v\_y^2\sin\left(\frac{a\_vy\,\pi\,y}{L}\right)^2\,rho\_0\Bigg)\Bigg)+\Bigg(\Bigg(v\_0\\
&+v\_x\cos\left(\frac{a\_vx\,\pi\,x}{L}\right)+v\_y\sin\left(\frac{a\_vy\,\pi\,y}{L}\right)\Bigg)\Bigg(
\end{aligned}
$$

$$
\begin{aligned}
&-\pi\, u\_y \sin\left(\frac{a\_uy\,\pi\, y}{L}\right) a\_uy\, u\_0\, \gamma\, rho\_0^2 \\
&+\pi\, u\_y \sin\left(\frac{a\_uy\,\pi\, y}{L}\right) a\_uy\, u\_0\, rho\_x^2 \sin\left(\frac{a\_rhox\,\pi\, x}{L}\right)^2 \\
&+\pi\, u\_y \sin\left(\frac{a\_uy\,\pi\, y}{L}\right) a\_uy\, u\_0\, rho\_0^2 \\
&+\pi\, u\_y^2 \sin\left(\frac{a\_uy\,\pi\, y}{L}\right) a\_uy \cos\left(\frac{a\_uy\,\pi\, y}{L}\right) rho\_0^2 \\
&-\pi\, v\_y \cos\left(\frac{a\_vy\,\pi\, y}{L}\right) a\_vy\, v\_0\, rho\_0^2 \\
&-\pi\, v\_y^2 \cos\left(\frac{a\_vy\,\pi\, y}{L}\right) a\_vy \sin\left(\frac{a\_vy\,\pi\, y}{L}\right) rho\_0^2 \\
&+\pi\, u\_y \sin\left(\frac{a\_uy\,\pi\, y}{L}\right) a\_uy\, u\_0\, rho\_y^2 \cos\left(\frac{a\_rhoy\,\pi\, y}{L}\right)^2 \\
&+\pi\, u\_y \sin\left(\frac{a\_uy\,\pi\, y}{L}\right) a\_uy\, u\_x \sin\left(\frac{a\_ux\,\pi\, x}{L}\right) rho\_0^2 \\
&-\pi\, u\_y^2 \sin\left(\frac{a\_uy\,\pi\, y}{L}\right) a\_uy \cos\left(\frac{a\_uy\,\pi\, y}{L}\right) \gamma\, rho\_0^2 \\
&+\pi\, u\_y^2 \sin\left(\frac{a\_uy\,\pi\, y}{L}\right) a\_uy \cos\left(\frac{a\_uy\,\pi\, y}{L}\right) rho\_x^2 \sin\left(\frac{a\_rhox\,\pi\, x}{L}\right)^2 \\
&+\pi\, u\_y^2 \sin\left(\frac{a\_uy\,\pi\, y}{L}\right) a\_uy \cos\left(\frac{a\_uy\,\pi\, y}{L}\right) rho\_y^2 \cos\left(\frac{a\_rhoy\,\pi\, y}{L}\right)^2 \\
&-\pi\, v\_y \cos\left(\frac{a\_vy\,\pi\, y}{L}\right) a\_vy\, v\_0\, rho\_x^2 \sin\left(\frac{a\_rhox\,\pi\, x}{L}\right)^2 \\
&-\pi\, v\_y \cos\left(\frac{a\_vy\,\pi\, y}{L}\right) a\_vy\, v\_0\, rho\_y^2 \cos\left(\frac{a\_rhoy\,\pi\, y}{L}\right)^2 \\
&-\pi\, v\_y \cos\left(\frac{a\_vy\,\pi\, y}{L}\right) a\_vy\, v\_x \cos\left(\frac{a\_vx\,\pi\, x}{L}\right) rho\_0^2 \\
&-\pi\, v\_y^2 \cos\left(\frac{a\_vy\,\pi\, y}{L}\right) a\_vy \sin\left(\frac{a\_vy\,\pi\, y}{L}\right) rho\_x^2 \sin\left(\frac{a\_rhox\,\pi\, x}{L}\right)^2 \\
&-\pi\, v\_y^2 \cos\left(\frac{a\_vy\,\pi\, y}{L}\right) a\_vy \sin\left(\frac{a\_vy\,\pi\, y}{L}\right) rho\_y^2 \cos\left(\frac{a\_rhoy\,\pi\, y}{L}\right)^2 \\
&+\pi\, v\_y \cos\left(\frac{a\_vy\,\pi\, y}{L}\right) a\_vy\, \gamma\, v\_0\, rho\_0^2 \\
&+\pi\, v\_y^2 \cos\left(\frac{a\_vy\,\pi\, y}{L}\right) a\_vy\, \gamma \sin\left(\frac{a\_vy\,\pi\, y}{L}\right) rho\_0^2 \\
&+p\_y \cos\left(\frac{a\_py\,\pi\, y}{L}\right) a\_py\, \pi\, rho\_0 \\
&-\pi\, u\_y \sin\left(\frac{a\_uy\,\pi\, y}{L}\right) a\_uy\, u\_0\, \gamma\, rho\_x^2 \sin\left(\frac{a\_rhox\,\pi\, x}{L}\right)^2
\end{aligned}
$$

$$
\begin{aligned}
&-\pi\, u\_y \sin\left(\frac{a\_uy\,\pi\, y}{L}\right) a\_uy\, u\_0\, \gamma\, rho\_y^2 \cos\left(\frac{a\_rhoy\,\pi\, y}{L}\right)^2 \\
&-\pi\, u\_y \sin\left(\frac{a\_uy\,\pi\, y}{L}\right) a\_uy\, u\_x \sin\left(\frac{a\_ux\,\pi\, x}{L}\right) \gamma\, rho\_0^2 \\
&+\pi\, u\_y \sin\left(\frac{a\_uy\,\pi\, y}{L}\right) a\_uy\, u\_x \sin\left(\frac{a\_ux\,\pi\, x}{L}\right) rho\_x^2 \sin\left(\frac{a\_rhox\,\pi\, x}{L}\right)^2 \\
&+\pi\, u\_y \sin\left(\frac{a\_uy\,\pi\, y}{L}\right) a\_uy\, u\_x \sin\left(\frac{a\_ux\,\pi\, x}{L}\right) rho\_y^2 \cos\left(\frac{a\_rhoy\,\pi\, y}{L}\right)^2 \\
&-\pi\, u\_y^2 \sin\left(\frac{a\_uy\,\pi\, y}{L}\right) a\_uy \cos\left(\frac{a\_uy\,\pi\, y}{L}\right) \gamma\, rho\_x^2 \sin\left(\frac{a\_rhox\,\pi\, x}{L}\right)^2 \\
&-\pi\, u\_y^2 \sin\left(\frac{a\_uy\,\pi\, y}{L}\right) a\_uy \cos\left(\frac{a\_uy\,\pi\, y}{L}\right) \gamma\, rho\_y^2 \cos\left(\frac{a\_rhoy\,\pi\, y}{L}\right)^2 \\
&-\pi\, v\_y \cos\left(\frac{a\_vy\,\pi\, y}{L}\right) a\_vy\, v\_x \cos\left(\frac{a\_vx\,\pi\, x}{L}\right) rho\_x^2 \sin\left(\frac{a\_rhox\,\pi\, x}{L}\right)^2 \\
&-\pi\, v\_y \cos\left(\frac{a\_vy\,\pi\, y}{L}\right) a\_vy\, v\_x \cos\left(\frac{a\_vx\,\pi\, x}{L}\right) rho\_y^2 \cos\left(\frac{a\_rhoy\,\pi\, y}{L}\right)^2 \\
&+\pi\, v\_y \cos\left(\frac{a\_vy\,\pi\, y}{L}\right) a\_vy\, \gamma\, v\_0\, rho\_x^2 \sin\left(\frac{a\_rhox\,\pi\, x}{L}\right)^2 \\
&+\pi\, v\_y \cos\left(\frac{a\_vy\,\pi\, y}{L}\right) a\_vy\, \gamma\, v\_0\, rho\_y^2 \cos\left(\frac{a\_rhoy\,\pi\, y}{L}\right)^2 \\
&+\pi\, v\_y \cos\left(\frac{a\_vy\,\pi\, y}{L}\right) a\_vy\, \gamma\, v\_x \cos\left(\frac{a\_vx\,\pi\, x}{L}\right) rho\_0^2 \\
&+\pi\, v\_y^2 \cos\left(\frac{a\_vy\,\pi\, y}{L}\right) a\_vy\, \gamma \sin\left(\frac{a\_vy\,\pi\, y}{L}\right) rho\_x^2 \sin\left(\frac{a\_rhox\,\pi\, x}{L}\right)^2 \\
&+\pi\, v\_y^2 \cos\left(\frac{a\_vy\,\pi\, y}{L}\right) a\_vy\, \gamma \sin\left(\frac{a\_vy\,\pi\, y}{L}\right) rho\_y^2 \cos\left(\frac{a\_rhoy\,\pi\, y}{L}\right)^2 \\
&+2\,\pi\, u\_y \sin\left(\frac{a\_uy\,\pi\, y}{L}\right) a\_uy\, u\_0\, rho\_0\, rho\_x \sin\left(\frac{a\_rhox\,\pi\, x}{L}\right) \\
&+2\,\pi\, u\_y \sin\left(\frac{a\_uy\,\pi\, y}{L}\right) a\_uy\, u\_0\, rho\_0\, rho\_y \cos\left(\frac{a\_rhoy\,\pi\, y}{L}\right) \\
&+2\,\pi\, u\_y^2 \sin\left(\frac{a\_uy\,\pi\, y}{L}\right) a\_uy \cos\left(\frac{a\_uy\,\pi\, y}{L}\right) rho\_0\, rho\_x \sin\left(\frac{a\_rhox\,\pi\, x}{L}\right) \\
&+2\,\pi\, u\_y^2 \sin\left(\frac{a\_uy\,\pi\, y}{L}\right) a\_uy \cos\left(\frac{a\_uy\,\pi\, y}{L}\right) rho\_0\, rho\_y \cos\left(\frac{a\_rhoy\,\pi\, y}{L}\right) \\
&-2\,\pi\, v\_y \cos\left(\frac{a\_vy\,\pi\, y}{L}\right) a\_vy\, v\_0\, rho\_0\, rho\_x \sin\left(\frac{a\_rhox\,\pi\, x}{L}\right) \\
&-2\,\pi\, v\_y \cos\left(\frac{a\_vy\,\pi\, y}{L}\right) a\_vy\, v\_0\, rho\_0\, rho\_y \cos\left(\frac{a\_rhoy\,\pi\, y}{L}\right) \\
&-2\,\pi\, v\_y^2 \cos\left(\frac{a\_vy\,\pi\, y}{L}\right) a\_vy \sin\left(\frac{a\_vy\,\pi\, y}{L}\right) rho\_0\, rho\_x \sin\left(\frac{a\_rhox\,\pi\, x}{L}\right)
\end{aligned}
$$

$$-2\,\pi\,v\_y^2\cos\left(\frac{a\_vy\,\pi\,y}{L}\right)a\_vy\sin\left(\frac{a\_vy\,\pi\,y}{L}\right)rho\_0\,rho\_y\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)$$

$$-2\,\pi\,u\_y\sin\left(\frac{a\_uy\,\pi\,y}{L}\right)a\_uy\,u\_0\,\gamma\,rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)rho\_0$$

$$-2\,\pi\,u\_y\sin\left(\frac{a\_uy\,\pi\,y}{L}\right)a\_uy\,u\_0\,\gamma\,rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)rho\_y$$

$$\cos\left({}^{1}\!\left/\!{}_{(L)\,(a\_rhoy\,\pi\,y)}\right.\right)$$

$$-2\,\pi\,u\_y\sin\left(\frac{a\_uy\,\pi\,y}{L}\right)a\_uy\,u\_0\,\gamma\,rho\_y\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)rho\_0$$

$$-2\,\pi\,u\_y\sin\left(\frac{a\_uy\,\pi\,y}{L}\right)a\_uy\,u\_x\sin\left(\frac{a\_ux\,\pi\,x}{L}\right)\gamma\,rho\_0\,rho\_x\sin\left({}^{1}\!\left/\!{}_{(L)\,(a\_rhox\,\pi\,x)}\right.\right)$$

$$-2\,\pi\,u\_y\sin\left(\frac{a\_uy\,\pi\,y}{L}\right)a\_uy\,u\_x\sin\left(\frac{a\_ux\,\pi\,x}{L}\right)\gamma\,rho\_0\,rho\_y\cos\left({}^{1}\!\left/\!{}_{(L)\,(a\_rhoy\,\pi\,y)}\right.\right)$$

$$+2\,\pi\,u\_y\sin\left(\frac{a\_uy\,\pi\,y}{L}\right)a\_uy\,u\_x\sin\left(\frac{a\_ux\,\pi\,x}{L}\right)rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)rho\_0$$

$$+2\,\pi\,u\_y\sin\left(\frac{a\_uy\,\pi\,y}{L}\right)a\_uy\,u\_x\sin\left(\frac{a\_ux\,\pi\,x}{L}\right)rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)rho\_y\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)$$

$$+2\,\pi\,u\_y\sin\left(\frac{a\_uy\,\pi\,y}{L}\right)a\_uy\,u\_x\sin\left(\frac{a\_ux\,\pi\,x}{L}\right)rho\_y\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)rho\_0$$

$$-2\,\pi\,u\_y^2\sin\left(\frac{a\_uy\,\pi\,y}{L}\right)a\_uy\cos\left(\frac{a\_uy\,\pi\,y}{L}\right)\gamma\,rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)rho\_0$$

$$-2\,\pi\,u\_y^2\sin\left(\frac{a\_uy\,\pi\,y}{L}\right)a\_uy\cos\left(\frac{a\_uy\,\pi\,y}{L}\right)\gamma\,rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)rho\_y\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)$$

$$-2\,\pi\,u\_y^2\sin\left(\frac{a\_uy\,\pi\,y}{L}\right)a\_uy\cos\left(\frac{a\_uy\,\pi\,y}{L}\right)\gamma\,rho\_y\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)$$

$$rho\_0$$

$$-2\,\pi\,v\_y\cos\left(\frac{a\_vy\,\pi\,y}{L}\right)a\_vy\,v\_x\cos\left(\frac{a\_vx\,\pi\,x}{L}\right)rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)$$

$$rho\_0$$

$$-2\,\pi\,v\_y\cos\left(\frac{a\_vy\,\pi\,y}{L}\right)a\_vy\,v\_x\cos\left(\frac{a\_vx\,\pi\,x}{L}\right)rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)$$

$$rho\_y\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)$$

$$-2\,\pi\,v\_y\cos\left(\frac{a\_vy\,\pi\,y}{L}\right)a\_vy\,v\_x\cos\left(\frac{a\_vx\,\pi\,x}{L}\right)rho\_y\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)$$

$$rho\_0+2\,\pi\,v\_y\cos\left(\frac{a\_vy\,\pi\,y}{L}\right)a\_vy\,\gamma\,v\_0\,rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)rho\_0$$

$$+2\,\pi\,v\_y\cos\left(\frac{a\_vy\,\pi\,y}{L}\right)a\_vy\,\gamma\,v\_0\,rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)rho\_y$$

$$\cos\left(1\Big/\left(L\right)\left(a\_rhoy\,\pi\,y\right)\right)$$

$$+2\,\pi\,v\_y\cos\left(\frac{a\_vy\,\pi\,y}{L}\right)a\_vy\,\gamma\,v\_0\,rho\_y\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)rho\_0$$

$$+2\,\pi\,v\_y\cos\left(\frac{a\_vy\,\pi\,y}{L}\right)a\_vy\,\gamma\,v\_x\cos\left(\frac{a\_vx\,\pi\,x}{L}\right)rho\_0\,rho\_x\sin(1/$$

$$(L)\,(a\_rhox\,\pi\,x))$$

$$+2\,\pi\,v\_y\cos\left(\frac{a\_vy\,\pi\,y}{L}\right)a\_vy\,\gamma\,v\_x\cos\left(\frac{a\_vx\,\pi\,x}{L}\right)rho\_0\,rho\_y\cos(1$$

$$/\,(L)\,(a\_rhoy\,\pi\,y))$$

$$+2\,\pi\,v\_y^2\cos\left(\frac{a\_vy\,\pi\,y}{L}\right)a\_vy\,\gamma\sin\left(\frac{a\_vy\,\pi\,y}{L}\right)rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)rho\_0$$

$$+2\,\pi\,v\_y^2\cos\left(\frac{a\_vy\,\pi\,y}{L}\right)a\_vy\,\gamma\sin\left(\frac{a\_vy\,\pi\,y}{L}\right)rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)rho\_y$$

$$\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)$$

$$+2\,\pi\,v\_y^2\cos\left(\frac{a\_vy\,\pi\,y}{L}\right)a\_vy\,\gamma\sin\left(\frac{a\_vy\,\pi\,y}{L}\right)rho\_y\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)rho\_0$$

$$+2\,\pi\,u\_y\sin\left(\frac{a\_uy\,\pi\,y}{L}\right)a\_uy\,u\_0\,rho\_x\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)rho\_y\cos(1$$

$$/\,(L)\,(a\_rhoy\,\pi\,y))$$

$$+2\,\pi\,u\_y^2\,\sin\left(\frac{a\_uy\,\pi\,y}{L}\right)\,a\_uy\,\cos\left(\frac{a\_uy\,\pi\,y}{L}\right)\,rho\_x\,\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)\,rho\_y\,\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)$$

$$-2\,\pi\,v\_y\,\cos\left(\frac{a\_vy\,\pi\,y}{L}\right)\,a\_vy\,v\_0\,rho\_x\,\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)\,rho\_y\,\cos(1\,/\,(L)\,(a\_rhoy\,\pi\,y))$$

$$-2\,\pi\,v\_y^2\,\cos\left(\frac{a\_vy\,\pi\,y}{L}\right)\,a\_vy\,\sin\left(\frac{a\_vy\,\pi\,y}{L}\right)\,rho\_x\,\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)\,rho\_y\,\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)$$

$$-\pi\,u\_y\,\sin\left(\frac{a\_uy\,\pi\,y}{L}\right)\,a\_uy\,u\_x\,\sin\left(\frac{a\_ux\,\pi\,x}{L}\right)\,\gamma\,rho\_x^2\,\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)^2$$

$$-2\,\pi\,u\_y\,\sin\left(\frac{a\_uy\,\pi\,y}{L}\right)\,a\_uy\,u\_x\,\sin\left(\frac{a\_ux\,\pi\,x}{L}\right)\,\gamma\,rho\_x\,\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)\,rho\_y\,\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)$$

$$-\pi\,u\_y\,\sin\left(\frac{a\_uy\,\pi\,y}{L}\right)\,a\_uy\,u\_x\,\sin\left(\frac{a\_ux\,\pi\,x}{L}\right)\,\gamma\,rho\_y^2\,\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)^2$$

$$+\pi\,v\_y\,\cos\left(\frac{a\_vy\,\pi\,y}{L}\right)\,a\_vy\,\gamma\,v\_x\,\cos\left(\frac{a\_vx\,\pi\,x}{L}\right)\,rho\_x^2\,\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)^2$$

$$+2\,\pi\,v\_y\,\cos\left(\frac{a\_vy\,\pi\,y}{L}\right)\,a\_vy\,\gamma\,v\_x\,\cos\left(\frac{a\_vx\,\pi\,x}{L}\right)\,rho\_x\,\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)\,rho\_y\,\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)$$

$$+\pi\,v\_y\,\cos\left(\frac{a\_vy\,\pi\,y}{L}\right)\,a\_vy\,\gamma\,v\_x\,\cos\left(\frac{a\_vx\,\pi\,x}{L}\right)\,rho\_y^2\,\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)^2$$

$$+p\_y\,\cos\left(\frac{a\_py\,\pi\,y}{L}\right)\,a\_py\,\pi\,rho\_x\,\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)$$

$$+p\_y\,\cos\left(\frac{a\_py\,\pi\,y}{L}\right)\,a\_py\,\pi\,rho\_y\,\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)$$

$$+rho\_y\,\sin\left(\frac{a\_rhoy\,\pi\,y}{L}\right)\,a\_rhoy\,\pi\,p\_0$$

$$+rho\_y\,\sin\left(\frac{a\_rhoy\,\pi\,y}{L}\right)\,a\_rhoy\,\pi\,p\_x\,\cos\left(\frac{a\_px\,\pi\,x}{L}\right)$$

$$+rho\_y\,\sin\left(\frac{a\_rhoy\,\pi\,y}{L}\right)\,a\_rhoy\,\pi\,p\_y\,\sin\left(\frac{a\_py\,\pi\,y}{L}\right)\Bigg)\Bigg)\Bigg/\Bigg((\gamma-1)\,L\left(rho\_0+rho\_x\,\sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)+rho\_y\,\cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)\right)\Bigg)+\Bigg(k\,\pi^2\,\Bigg($$

$$
\begin{aligned}
&-2\ p\_x \sin\left(\frac{a\_px\,\pi\,x}{L}\right) a\_px\ rho\_x \cos\left(\frac{a\_rhox\,\pi\,x}{L}\right) a\_rhox\ rho\_0 \\
&-2\ p\_x \sin\left(\frac{a\_px\,\pi\,x}{L}\right) a\_px\ rho\_x^2 \cos\left(\frac{a\_rhox\,\pi\,x}{L}\right) a\_rhox \sin\left(\frac{a\_rhox\,\pi\,x}{L}\right) \\
&-2\ p\_x \sin\left(\frac{a\_px\,\pi\,x}{L}\right) a\_px\ rho\_x \cos\left(\frac{a\_rhox\,\pi\,x}{L}\right) a\_rhox\ rho\_y \\
&\cos\left(1 \Big/ \left(\frac{(L)}{a\_rhoy\,\pi\,y}\right)\right) \\
&+2\ p\_x \cos\left(\frac{a\_px\,\pi\,x}{L}\right) a\_px^2\ rho\_x \sin\left(\frac{a\_rhox\,\pi\,x}{L}\right) rho\_y \cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right) \\
&-rho\_x \sin\left(\frac{a\_rhox\,\pi\,x}{L}\right) a\_rhox^2\ rho\_0\ p\_0 \\
&-rho\_x \sin\left(\frac{a\_rhox\,\pi\,x}{L}\right) a\_rhox^2\ rho\_0\ p\_x \cos\left(\frac{a\_px\,\pi\,x}{L}\right) \\
&-rho\_x \sin\left(\frac{a\_rhox\,\pi\,x}{L}\right) a\_rhox^2\ rho\_0\ p\_y \sin\left(\frac{a\_py\,\pi\,y}{L}\right) \\
&+2\ p\_x \cos\left(\frac{a\_px\,\pi\,x}{L}\right) a\_px^2\ rho\_0\ rho\_x \sin\left(\frac{a\_rhox\,\pi\,x}{L}\right) \\
&-2\ rho\_x^2 \cos\left(\frac{a\_rhox\,\pi\,x}{L}\right)^2 a\_rhox^2\ p\_0 \\
&-2\ rho\_x^2 \cos\left(\frac{a\_rhox\,\pi\,x}{L}\right)^2 a\_rhox^2\ p\_x \cos\left(\frac{a\_px\,\pi\,x}{L}\right) \\
&-2\ rho\_x^2 \cos\left(\frac{a\_rhox\,\pi\,x}{L}\right)^2 a\_rhox^2\ p\_y \sin\left(\frac{a\_py\,\pi\,y}{L}\right) \\
&-rho\_x^2 \sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)^2 a\_rhox^2\ p\_0 \\
&-rho\_x^2 \sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)^2 a\_rhox^2\ p\_x \cos\left(\frac{a\_px\,\pi\,x}{L}\right) \\
&-rho\_x^2 \sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)^2 a\_rhox^2\ p\_y \sin\left(\frac{a\_py\,\pi\,y}{L}\right) \\
&+p\_x \cos\left(\frac{a\_px\,\pi\,x}{L}\right) a\_px^2\ rho\_0^2 \\
&+p\_x \cos\left(\frac{a\_px\,\pi\,x}{L}\right) a\_px^2\ rho\_y^2 \cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)^2 \\
&-rho\_x \sin\left(\frac{a\_rhox\,\pi\,x}{L}\right) a\_rhox^2\ rho\_y \cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right) p\_0 \\
&-rho\_x \sin\left(\frac{a\_rhox\,\pi\,x}{L}\right) a\_rhox^2\ rho\_y \cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right) p\_x \cos\left(\frac{a\_px\,\pi\,x}{L}\right) \\
&-rho\_x \sin\left(\frac{a\_rhox\,\pi\,x}{L}\right) a\_rhox^2\ rho\_y \cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right) p\_y \sin\left(\frac{a\_py\,\pi\,y}{L}\right)
\end{aligned}
$$

$$+ p\_x \cos\left(\frac{a\_px\,\pi\,x}{L}\right) a\_px^2\, rho\_x^2 \sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)^2$$
$$+ 2\, p\_x \cos\left(\frac{a\_px\,\pi\,x}{L}\right) a\_px^2\, rho\_0\, rho\_y \cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)\Bigg)\Bigg) \Bigg/$$
$$\left(R\left(rho\_0 + rho\_x \sin\left(\frac{a\_rhox\,\pi\,x}{L}\right) + rho\_y \cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)\right)^3 L^2\right)$$
$$+ \left(k\pi^2\left(-2\, p\_y \cos\left(\frac{a\_py\,\pi\,y}{L}\right) a\_py\, rho\_y \sin\left(\frac{a\_rhoy\,\pi\,y}{L}\right) a\_rhoy\, rho\_0 - 2\, p\_y \cos\left(\frac{a\_py\,\pi\,y}{L}\right) a\_py\, rho\_y^2 \sin\left(\frac{a\_rhoy\,\pi\,y}{L}\right) a\_rhoy \cos(1/(L)(a\_rhoy\,\pi\,y))\right.\right.$$
$$+ 2\, p\_y \sin\left(\frac{a\_py\,\pi\,y}{L}\right) a\_py^2\, rho\_x \sin\left(\frac{a\_rhox\,\pi\,x}{L}\right) rho\_y \cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)$$
$$- rho\_y \cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right) a\_rhoy^2\, rho\_0\, p\_0$$
$$- rho\_y \cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right) a\_rhoy^2\, rho\_0\, p\_x \cos\left(\frac{a\_px\,\pi\,x}{L}\right)$$
$$- rho\_y \cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right) a\_rhoy^2\, rho\_0\, p\_y \sin\left(\frac{a\_py\,\pi\,y}{L}\right)$$
$$+ 2\, p\_y \sin\left(\frac{a\_py\,\pi\,y}{L}\right) a\_py^2\, rho\_0\, rho\_x \sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)$$
$$- 2\, rho\_y^2 \sin\left(\frac{a\_rhoy\,\pi\,y}{L}\right)^2 a\_rhoy^2\, p\_0$$
$$- 2\, rho\_y^2 \sin\left(\frac{a\_rhoy\,\pi\,y}{L}\right)^2 a\_rhoy^2\, p\_x \cos\left(\frac{a\_px\,\pi\,x}{L}\right)$$
$$- 2\, rho\_y^2 \sin\left(\frac{a\_rhoy\,\pi\,y}{L}\right)^2 a\_rhoy^2\, p\_y \sin\left(\frac{a\_py\,\pi\,y}{L}\right)$$
$$- rho\_y \cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right) a\_rhoy^2\, rho\_x \sin\left(\frac{a\_rhox\,\pi\,x}{L}\right) p\_0$$
$$- rho\_y \cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right) a\_rhoy^2\, rho\_x \sin\left(\frac{a\_rhox\,\pi\,x}{L}\right) p\_x \cos\left(\frac{a\_px\,\pi\,x}{L}\right)$$
$$- rho\_y \cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right) a\_rhoy^2\, rho\_x \sin\left(\frac{a\_rhox\,\pi\,x}{L}\right) p\_y \sin\left(\frac{a\_py\,\pi\,y}{L}\right)$$
$$+ p\_y \sin\left(\frac{a\_py\,\pi\,y}{L}\right) a\_py^2\, rho\_0^2$$
$$+ p\_y \sin\left(\frac{a\_py\,\pi\,y}{L}\right) a\_py^2\, rho\_y^2 \cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)^2$$
$$- rho\_y^2 \cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)^2 a\_rhoy^2\, p\_0$$

$$
\begin{aligned}
&- rho\_y^2 \cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)^2 a\_rhoy^2\, p\_x \cos\left(\frac{a\_px\,\pi\,x}{L}\right) \\
&- rho\_y^2 \cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)^2 a\_rhoy^2\, p\_y \sin\left(\frac{a\_py\,\pi\,y}{L}\right) \\
&+ p\_y \sin\left(\frac{a\_py\,\pi\,y}{L}\right) a\_py^2\, rho\_x^2 \sin\left(\frac{a\_rhox\,\pi\,x}{L}\right)^2 \\
&+ 2\, p\_y \sin\left(\frac{a\_py\,\pi\,y}{L}\right) a\_py^2\, rho\_0\, rho\_y \cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)\Bigg)\Bigg) \Bigg/ \\
&\left(R\left(rho\_0 + rho\_x \sin\left(\frac{a\_rhox\,\pi\,x}{L}\right) + rho\_y \cos\left(\frac{a\_rhoy\,\pi\,y}{L}\right)\right)^3 L^2\right) \\
&+ \frac{1}{L}\Bigg(\pi\left(p\_0 + p\_x \cos\left(\frac{a\_px\,\pi\,x}{L}\right)\right. \\
&\left. + p\_y \sin\left(\frac{a\_py\,\pi\,y}{L}\right)\right)\left(v\_y \cos\left(\frac{a\_vy\,\pi\,y}{L}\right) a\_vy\right. \\
&\left. + u\_x \cos\left(\frac{a\_ux\,\pi\,x}{L}\right) a\_ux\right)\Bigg) + \frac{1}{3}\,\frac{1}{L^2}\Bigg(\left(v\_0 + v\_x \cos\left(\frac{a\_vx\,\pi\,x}{L}\right)\right. \\
&\left. + v\_y \sin\left(\frac{a\_vy\,\pi\,y}{L}\right)\right)\left(3\, p\_y \cos\left(\frac{a\_py\,\pi\,y}{L}\right) a\_py\,\pi\,L\right. \\
&\left. + 3\,\mu\, v\_x \cos\left(\frac{a\_vx\,\pi\,x}{L}\right) a\_vx^2\,\pi^2 + 4\,\mu\, v\_y \sin\left(\frac{a\_vy\,\pi\,y}{L}\right) a\_vy^2\,\pi^2\right)\Bigg) \\
&+ \frac{1}{3}\,\frac{1}{L^2}\Bigg(\left(u\_0 + u\_x \sin\left(\frac{a\_ux\,\pi\,x}{L}\right)\right. \\
&\left. + u\_y \cos\left(\frac{a\_uy\,\pi\,y}{L}\right)\right)\left(4\,\mu\, u\_x \sin\left(\frac{a\_ux\,\pi\,x}{L}\right) a\_ux^2\,\pi^2\right. \\
&\left. - 3\, p\_x \sin\left(\frac{a\_px\,\pi\,x}{L}\right) a\_px\,\pi\,L + 3\,\mu\, u\_y \cos\left(\frac{a\_uy\,\pi\,y}{L}\right) a\_uy^2\,\pi^2\right)\Bigg) \\
&- \frac{2}{3}\,\frac{1}{L}\Bigg(u\_x \cos\left(\frac{a\_ux\,\pi\,x}{L}\right) a\_ux\,\pi\,\mu\left(\frac{2\, u\_x \cos\left(\frac{a\_ux\,\pi\,x}{L}\right) a\_ux\,\pi}{L}\right. \\
&\left. - \frac{v\_y \cos\left(\frac{a\_vy\,\pi\,y}{L}\right) a\_vy\,\pi}{L}\right)\Bigg) + \frac{1}{L}\Bigg(v\_x \sin\left(\frac{a\_vx\,\pi\,x}{L}\right) a\_vx\,\pi\,\mu\left(\right. \\
&\left. - \frac{u\_y \sin\left(\frac{a\_uy\,\pi\,y}{L}\right) a\_uy\,\pi}{L} - \frac{v\_x \sin\left(\frac{a\_vx\,\pi\,x}{L}\right) a\_vx\,\pi}{L}\right)\Bigg) \\
&+ \frac{1}{L}\Bigg(u\_y \sin\left(\frac{a\_uy\,\pi\,y}{L}\right) a\_uy\,\pi\,\mu\left(-\frac{u\_y \sin\left(\frac{a\_uy\,\pi\,y}{L}\right) a\_uy\,\pi}{L}\right. \\
&\left. - \frac{v\_x \sin\left(\frac{a\_vx\,\pi\,x}{L}\right) a\_vx\,\pi}{L}\right)\Bigg)
\end{aligned}
$$

$$\left[-\frac{2}{3}\ \frac{1}{L}\left(v\_y\cos\left(\frac{a\_vy\pi\, y}{L}\right) a\_vy\pi\,\mu\left(\frac{2\ v\_y\cos\left(\frac{a\_vy\pi\, y}{L}\right) a\_vy\pi}{L} - \frac{u\_x\cos\left(\frac{a\_ux\pi\, x}{L}\right) a\_ux\pi}{L}\right)\right)\right]$$